AMENDMENTS TO THE CLAIMS

1. (Currently amended) A sensor network comprising a plurality of network elements including at least one node configured to be coupled among a monitored environment,

wherein the at least one node is further configured to be remotely controllable ~~using at least one client computer~~ and to ~~provide~~ determine ~~node information including~~ an energy ~~node resource~~ cost for communication and a message priority ~~to one or more other nodes of the plurality of network elements~~,

wherein the at least one node is further configured to distribute objects for data processing~~, other than processing for topology learning or the addition of one or more new nodes to the sensor network,~~ to one or more of the plurality of network elements ~~in response to the node information~~, wherein the objects for data processing comprise data and executable code, and

wherein the distribution of the objects for data processing varies ~~dynamically~~ based on the energy cost for communication and the message priority.

2. (Original) The sensor network of claim 1, wherein the at least one node includes sensing, processing, communications, and storage devices supporting a plurality of processing and protocol layers.

3. (Previously presented) The sensor network of claim 1, wherein the at least one node supports at least one communication mode selected from the group consisting of wireless communications, wired communications, and hybrid wired and wireless communications.

4. (Currently amended) The sensor network of claim 1, wherein the at least one node is coupled to ~~the at least one client computer through~~ the plurality of network elements, wherein the plurality of network elements includes at least one gateway, at least one server, and at least one network.

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5. (Original) The sensor network of claim 4, wherein the at least one gateway comprises at least one node.

6. (Previously presented) The sensor network of claim 4, wherein the at least one gateway is configured to perform at least one function selected from the group consisting of protocol translation, sensor network management, management of transmissions from a remote user, and to interface with at least one communication physical layer including wired local area network, packet radio, microwave, optical, wireline telephony, cellular telephony, and satellite telephony.

7. (Original) The sensor network of claim 4, wherein the at least one network includes wired networks, wireless networks, and hybrid wired and wireless networks.

8. (Previously presented) The sensor network of claim 4, wherein the at least one network comprises at least one network selected from the group consisting of the Internet, local area networks, wide area networks, metropolitan area networks, and information service stations.

9. (Currently amended) The sensor network of claim 8, wherein internetworking among the plurality of network elements ~~provides remote accessibility using World Wide Web-based~~ comprises accessing tools for data, code, management, and security functions, wherein data includes signals or images, wherein code includes signal processing, decision support, and database elements, and wherein management includes operation of the at least one node and the sensor network.

10. (Currently amended) The sensor network of claim 4, ~~wherein the at least one node is coupled to the at least one gateway using the plurality of network elements,~~ wherein the plurality of network elements further includes at least one device selected from the group consisting of repeaters and interrogators.

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11. (Original) The sensor network of claim 1, wherein at least one local user is coupled to the at least one node.

12. (Original) The sensor network of claim 1, wherein at least one redundant information pathway is established among the plurality of network elements.

13. (Original) The sensor network of 1, wherein the plurality of network elements comprise a plurality of network element sets, wherein the plurality of network element sets are layered.

14. (Original) The sensor network of claim 1, wherein the at least one node comprises a plurality of node types, wherein the plurality of node types includes at least one node of a first type and at least one node of a second type, wherein a first network having a first node density is assembled using the at least one node of a first type, wherein a second network having a second node density is assembled using the at least one node of a second type, wherein the second network is overlayed onto the first network.

15. (Currently amended) The sensor network of claim 1, wherein the executable code and data anticipated for future use are predistributed through the sensor network using low priority messages, wherein the executable code and the data are downloadable from at least one location selected from the group consisting of storage devices of the plurality of network elements, and storage devices outside the sensor network.

16. (Previously presented) The sensor network of claim 1, wherein the plurality of network elements is configured to automatically organize, and wherein the automatic organizing comprises automatically controlling data transfer, processing, and storage within the sensor network.

17. (Currently amended) The sensor network of claim 1, wherein a plurality of levels of synchronization are supported among different subsets of the plurality of network elements,

wherein a first level of synchronization is supported among a first subset of the plurality of network elements, and wherein a second level of synchronization is supported among a second subset of the plurality of network elements.

18. (Previously presented) The sensor network of claim 1, wherein data processing is controlled using at least one processing hierarchy, the at least one processing hierarchy controlling at least one event selected from the group consisting of data classifications, data transfers, data queuing, data combining, processing locations, and communications among the plurality of network elements.

19. (Currently amended) The sensor network of claim 1, wherein data is transferred using message packets, wherein the message packets are aggregated into compact forms in the at least one node using message aggregation protocols, and wherein the message aggregation protocols are adaptive to at least one feature selected from the group consisting of data type, node density, message priority, and available energy.

20. (Currently amended) The sensor network of claim 19, wherein the message packets include decoy message packets, and wherein information to be transferred is communicated using ~~impressed on~~ random message packets ~~to provide communication privacy~~.

21. (Previously presented) The sensor network of claim 1, wherein functions of the at least one node include data acquisition, data processing, communication, data routing, data security, programming, and node operation.

22. (Previously presented) The sensor network of claim 1, wherein the at least one node includes at least one preprocessor coupled to at least one processor and a plurality of application programming interfaces (APIs), wherein the plurality of APIs are coupled to control at least one device selected from the group consisting of sensors, actuators, communications devices, signal processors, information storage devices, node controllers, and power supply devices, wherein the plurality of APIs support remote reprogramming and control of the at least one device.

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23. (Original) The sensor network of claim 22, wherein the plurality of APIs are layered.

24. (Currently amended) The sensor network of claim 22, wherein the plurality of APIs ~~enable distributed resource management by providing~~ are configured to communicate network resource information and message priority information to the plurality of network elements.

25. (Original) The sensor network of claim 24, wherein information transfer among the plurality of network elements is controlled using a synchronism hierarchy established in response to the resource information and message priority information.

26. (Previously presented) The sensor network of claim 22, wherein the at least one preprocessor performs at least one function selected from the group consisting of data acquisition, alert functions, and controlling at least one operating state of the at least one node.

27. (Previously presented) The sensor network of claim 22, wherein the at least one processor is configured to perform at least one function selected from the group consisting of signal identification, database management, adaptation, reconfiguration, and security.

28. (Previously presented) The sensor network of claim 1, wherein the at least one node is configured to control data processing and data transmission in response to a decision probability of a detected event.

29. (Previously presented) The sensor network of claim 1, wherein the at least one node includes at least one sensor selected from the group consisting of seismic, acoustic, infrared, thermal, force, vibration, pressure, humidity, current, voltage, magnetic, biological, chemical, acceleration, and visible light sensors.

30. (Original) The sensor network of claim 29, wherein the at least one sensor is external to the at least one node.

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31. (Original) The sensor network of claim 29, wherein data gathered by the at least one sensor is processed and a predetermined identifying code representing the data is propagated through the network, wherein a high priority message containing information regarding a high priority event is represented by a high priority message code, and wherein receipt of the high priority message code by the at least one node invokes a priority protocol that causes message packets to be broadcast to nodes adjacent to a path that will inhibit messaging from nodes not engaged in conveying the information regarding the high priority event.

32. (Previously presented) The sensor network of claim 1, wherein the plurality of network elements are self-assembling, wherein search and acquisition modes of the at least one node search for participating ones of the plurality of network elements, wherein a determination is made whether each of the participating ones of the plurality of network elements are permitted to join the sensor network using a message hierarchy, and wherein the sensor network is surveyed at random intervals for new nodes and missing nodes.

33. (Cancelled)

34. (Previously presented) The sensor network of claim 1, wherein a start node is selected as a base node, wherein the base node communicates an assembly packet throughout the sensor network, wherein information of the assembly packet alternates with each successive communication between directing a node to become a base node of a particular cluster number and directing a node to become a remote node of a particular cluster number, and wherein the particular cluster number is incrementally changed with each successive communication of the assembly packet.

35. (Previously presented) The sensor network of claim 1, wherein at least one start node is selected as at least one base node, wherein the at least one base node communicates an assembly packet throughout the sensor network, wherein information of the assembly packet alternates with each successive communication between directing at least one node to become at

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least one base node of a particular cluster number and directing at least one other node to become at least one remote node of a particular cluster number, and wherein the particular cluster number is incrementally changed with each successive communication of the assembly packet.

36. (Previously presented) The sensor network of claim 1, wherein synchronism is established among the plurality of network elements using assembly packets.

37. (Previously presented) The sensor network of claim 1, wherein the sensor network is managed as a distributed and active database using a distributed resource management protocol, wherein the plurality of network elements are reused among different applications, and wherein the plurality of network elements are used in multiple classes of applications.

38. (Previously presented) The sensor network of claim 1, further comprising at least one database, wherein the at least one database includes at least one storage device selected from the group consisting of storage devices coupled to at least one of the plurality of network elements and storage devices of the at least one node.

39. (Currently amended) The sensor network of claim 38, wherein cooperative sensing uses information of the at least one database ~~to provide~~ for non-local event correlation.

40. (Original) The sensor network of claim 38, wherein the at least one database comprises data-driven alerting methods that recognize conditions on user-defined data relationships including coincidence in signal arrival, node power status, and network communication status.

41. (Original) The sensor network of claim 38, wherein the at least one database is implemented in small foot print databases at a level of the at least one node and in standard query language (SQL) database systems at a level of at least one server.

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42. (Previously presented) The sensor network of claim 1, wherein data is collected by the at least one node, and wherein at least one operation is performed on the data in response to parameters established by a user input, the at least one operation selected from the group consisting of energy detection, routing, processing, storing, and fusing.

43. (Original) The sensor network of claim 42, wherein the routing, processing, storing, and fusing are performed in response to at least one result of the energy detection.

44. (Original) The sensor network of claim 42, wherein routing comprises selecting at least one data type for routing, selecting at least one of the plurality of network elements to which to route the selected data, selecting at least one route to the selected at least one of the plurality of network elements, and routing the selected at least one data type to the selected at least one of the plurality of network elements.

45. (Original) The sensor network of claim 44, wherein routing comprises transmitting data in at least one message as a compact entry in a codebook.

46. (Original) The sensor network of claim 42, wherein processing comprises selecting at least one data type for processing, selecting at least one processing type, selecting at least one of the plurality of network elements to perform the selected at least one processing type, and transferring the selected at least one data type to the selected at least one of the plurality of network elements using at least one route through the sensor network.

47. (Previously presented) The sensor network of claim 46, wherein selecting the at least one processing type comprises determining at least one probability associated with a detected event and selecting at least one processing type in response to the at least one probability.

48. (Previously presented) The sensor network of claim 46, wherein data processed in a plurality of nodes is aggregated for further processing.

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49. (Previously presented) The sensor network of claim 46, wherein data processed by the at least one node is aggregated for reporting.

50. (Previously presented) The sensor network of claim 42, wherein storing comprises selecting at least one data type for storage, selecting at least one storage type, selecting at least one of the plurality of network elements to perform the selected at least one storage type, and transferring the selected at least one data type to the selected at least one of the plurality of network elements using at least one route through the sensor network.

51. (Previously presented) The sensor network of claim 42, wherein fusing comprises a first node transmitting at least one query request to at least one other node, wherein the first node collects data from the at least one other node in response to the at least one query request and processes the collected data.

52. (Currently amended) The sensor network of claim 1, wherein the at least one node comprises a plurality of nodes with each of the plurality of nodes including at least one hi-static sensor and a generator for producing at least one energy beam that is radiated from the plurality of nodes, wherein the at least one energy beam comprises a combined probe beam and signal code for beam intensity control and propagation measurement, wherein the at least one energy beam is modulated in time to ~~provide~~ communicate an identifying code corresponding to a source node, and wherein the at least one energy beam is at least one type selected from the group consisting of infrared, visible, acoustic, and microwave beams.

53. (Original) The sensor network of claim 1, wherein at least one of the plurality of network elements determines a position of the at least one node.

54. (Previously presented) The sensor network of claim 1, wherein software is transferable among the plurality of network elements, and wherein software transfer is remotely controllable.

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55. (Original) The sensor network of claim 1, wherein at least one public key security protocol is used to protect communications.

56. (Currently amended) The sensor network of claim 1, wherein the at least one node includes a Global Positioning System device ~~providing location and time information~~.

57. (Previously presented) The sensor network of claim 1, wherein the at least one node comprises at least one communication modem.

58. (Original) The sensor network of claim 1, wherein communications among the plurality of network elements comprise multihop communications.

59. (Previously presented) The sensor network of claim 1, wherein the monitored environment is at least one environment selected from the group consisting of electronic equipment, mechanical equipment, electro-mechanical equipment, a facility, a structure, a material, a transportation system, a vehicle, an outdoor area, an indoor area, a biological system, a person, and an animal.

60. (Previously presented) The sensor network of claim 1, wherein the plurality of network elements are configured for short range and long range communications.

61. (Previously presented) The sensor network of claim 1, wherein the at least one node is configured to be contained in a sealed and waterproof system.

62. (Previously presented) The sensor network of claim 1, wherein the at least one node comprises a plurality of software modules, wherein a plurality of interfaces support couplings among the plurality of software modules, wherein the plurality of interfaces are reused among the plurality of software modules by changing at least one inter-module coupling, and wherein the plurality of software modules are dynamically configured at run-time.

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63. (Currently amended) A sensor network comprising a plurality of network elements including at least one node configured to be coupled among an environment, and

wherein the at least one node is further configured to be remotely controllable and programmable via internetworking among the plurality of network elements,

wherein the at least one node is further configured to ~~provide~~ determine ~~node information including node resource information~~ an energy cost for communication and a message priority ~~to one or more other nodes of the plurality of network elements~~,

wherein the at least one node is further configured to distribute data processing~~, other than processing for topology learning or the addition of one or more new nodes to the sensor network,~~ in the sensor network ~~in response to the node information~~, and

wherein the distribution of the data processing varies ~~dynamically~~ based on the energy cost for communication and the message priority.

64. (Cancelled)

65. (Previously presented) The sensor network of claim 63, wherein the plurality of network elements comprise a plurality of network element sets, and wherein the plurality of network element sets are layered.

66. (Currently amended) The sensor network of claim 63, wherein the plurality of network elements is configured to predistribute executable code and data to at least a portion of the plurality of network elements using low priority messages, and wherein the executable code and the data are downloadable from at least one location selected from the group consisting of storage devices of the plurality of network elements, and storage devices outside the sensor network.

67. (Previously presented) The sensor network of claim 63, wherein the plurality of network elements is configured to automatically organize, and wherein automatic organizing comprises automatically controlling data transfer, processing, and storage within the sensor network.

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68. (Original) The sensor network of claim 63, wherein a plurality of synchronization levels are supported among different subsets of the plurality of network elements.

69. (Previously presented) The sensor network of claim 63, wherein the at least one node is configured to control data processing using at least one processing hierarchy, the at least one processing hierarchy controlling at least one function selected from the group consisting of data classifications, data transfers, data queuing, data combining, processing locations, and communications among the plurality of network elements.

70. (Previously presented) The sensor network of claim 63, wherein the at least one node includes at least one preprocessor coupled to at least one processor and a plurality of application programming interfaces (APIs), wherein the plurality of APIs is configured to control at least one device selected from the group consisting of sensors, actuators, communications devices, signal processors, information storage devices, node controllers, and power supply devices, and wherein the plurality of APIs are layered.

71. (Previously presented) The sensor network of claim 63, wherein the at least one node is further configured to control data processing and data transfer in response to a decision probability of a detected event in the environment.

72. (Previously presented) The sensor network of claim 63, wherein the at least one node is further configured to search, using search and acquisition modes of the at least one node, for participating ones of the plurality of network elements, wherein a determination is made whether each of the participating ones of the plurality of network elements are permitted to join the sensor network using a message hierarchy, and the at least one node is further configured to survey the sensor network at random intervals for new nodes and missing nodes.

73. (Previously presented) The sensor network of claim 63, wherein the sensor network is configured to be managed as a distributed and active database using a distributed resource

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management protocol, wherein the plurality of network elements are reused among different applications, and wherein the network elements are used in multiple classes of applications.

74. (Previously presented) The sensor network of claim 63, wherein the at least one node is further configured to collect data and to perform at least one operation on the data in response to parameters remotely established by a user input, the at least one operation selected from the group consisting of energy detection, routing, processing, storing, and fusing.

75. (Original) The sensor network of claim 74, wherein routing comprises selecting at least one data type for routing, selecting at least one of the plurality of network elements to which to route the selected data, selecting at least one route to the selected at least one of the plurality of network elements, and routing the selected at least one data type to the selected at least one of the plurality of network elements.

76. (Previously presented) The sensor network of claim 74, wherein processing comprises selecting at least one data type for processing, selecting at least one processing type, selecting at least one of the plurality of network elements to perform the selected at least one processing type, and transferring the selected at least one data type to the selected at least one of the plurality of network elements using at least one route through the sensor network.

77. (Original) The sensor network of claim 74, wherein storing comprises selecting at least one data type for storage, selecting at least one storage type, selecting at least one of the plurality of network elements to perform the selected at least one storage type, and transferring the selected at least one data type to the selected at least one of the plurality of network elements using at least one route through the sensor network.

78. (Currently amended) The sensor network of claim 74, wherein fusing comprises a first node transmitting at least one query request to at least one other node, and wherein the first node collects data from the at least one other node in response to the at least one query request and processes the collected data.

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79. (Previously presented) The sensor network of claim 63, wherein software is transferable among the plurality of network elements, and wherein software transfer is remotely controllable.

80-82. (Cancelled)

83. (Currently amended) A sensor network comprising:

means for coupling a plurality of network elements including at least one local node ~~among a local environment~~, wherein at least one function of the at least one local node is configured for remote control;

means for collecting sensor data ~~from the local environment~~;

means for ~~providing~~ communicating node information regarding message priority and energy availability from the at least one local node to one or more other nodes of the plurality of network elements;

means for distributing processing of the collected sensor data among the plurality of network elements,

wherein the distribution of the data processing varies dynamically based on the message priority and the energy availability, and

wherein the one or more other nodes are each a member of the sensor network prior to receiving the node information from the at least one local node.

84-91. (Cancelled)

92. (Currently amended) A sensor network comprising a plurality of network elements including at least one node configured to be coupled among a monitored environment,

wherein the at least one node includes at least one sensor,

wherein the at least one node is further configured to process data gathered from the monitored environment by the at least one sensor and to propagate a predetermined identifying code representing the gathered data through the sensor network,

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wherein the plurality of network elements is configured to ~~represent~~ communicate a high priority message code for ~~a high priority message containing information regarding~~ a high priority event ~~by a high priority message code~~,

wherein, in response to receipt of the high priority message code, [[by]] the at least one node is configured to broadcast one or more inhibit messages configured to ~~invokes a priority protocol that causes message packets to be broadcast to nodes adjacent to a path that will~~ inhibit messaging from nodes not engaged in conveying the ~~information regarding the~~ high priority event, and

wherein a distribution of data processing by the plurality of network elements varies ~~dynamically~~ based on a priority of the message.

93. (Cancelled)

94. (Currently amended) The sensor network of claim 92, wherein the at least one node is further configured to ~~provide~~ communicate an energy cost ~~node information~~ to the plurality of network elements, and wherein the plurality of network elements is configured to distribute data processing through the sensor network based on the energy cost ~~in response to the node information~~.

95-100. (Cancelled)

101. (Currently amended) A network comprising:

a plurality of network elements including at least one node configured to be coupled among a monitored or controlled environment,

wherein the at least one node is further configured to ~~provide~~ determine ~~node information including~~ a message priority and an energy ~~availability~~ cost for communication ~~to the plurality of network elements~~ and to ~~predistribute~~ distribute data and executable code ~~and data anticipated for future use~~ through the network using ~~low priority~~ messages of predetermined priority,

wherein the plurality of network elements is configured to distribute data processing through the network, and

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wherein the distribution of data processing varies ~~dynamically~~ based on at least ~~the message priority or~~ the energy cost for communication ~~availability~~.

102. (Cancelled)

103. (Currently amended) A sensor network comprising:

a plurality of network elements including at least one node configured to be coupled among a monitored environment,

wherein the at least one node is further configured to ~~provide~~ communicate ~~node information including node resource~~ an energy cost for communication and a message priority to the plurality of network elements,

wherein the plurality of network elements is configured to distribute data processing through the sensor network in response to the ~~node resource~~ energy cost for communication,

wherein the distribution of the data processing comprises selecting at least one data type for processing, selecting at least one of the plurality of network elements to process the selected at least one data type, and transferring data of the selected at least one data type to the selected at least one of the plurality of network elements, and

wherein the distribution of data processing varies ~~dynamically~~ based on the message priority.

104-111. (Cancelled)

112. (Currently amended) A sensor network comprising:

a plurality of network elements including at least one local node configured to be coupled among a monitored local environment, wherein the at least one local node is further configured to collect sensor data from the monitored local environment, to be remotely controllable ~~using at least one client computer~~, and to ~~provide~~ determine information regarding message priority to one or more other nodes of the plurality of network elements; and

wherein the plurality of network elements is configured to distribute, after the at least one local node has become a member of the sensor network, data processing on the collected data to

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one or more of the plurality of network elements, and wherein the distribution of the data processing varies ~~dynamically~~ based on the message priority and an energy cost for communication.

113. (Previously presented) The sensor network of claim 112, wherein the distribution of the data processing comprises:

routing the collected data of a first data type to a first one of the plurality of network elements; and

routing the collected data of a second data type to a second one of the plurality of network elements.

114. (Previously presented) The sensor network of claim 112, wherein the distribution of the data processing comprises selecting a processing type, selecting at least one of the plurality of network elements to perform the selected processing type, and transferring at least a portion of the collected data to the selected at least one of the plurality of network elements for processing.

115. (Previously presented) The sensor network of claim 112, wherein the plurality of network elements is further configured to select at least one storage type for at least a portion of the collected data, to select at least one of the plurality of network elements to store data of the at least one storage type, and to transfer the at least a portion of the collected data to the selected at least one of the plurality of network elements.

116. (Previously presented) The sensor network of claim 112, wherein the at least one local node comprises:

at least one sensor for collecting the sensor data;

a preprocessor coupled to receive the collected data from the at least one sensor; and

a processor, coupled to the preprocessor, configured to perform processing associated with the collected data.

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117. (Previously presented) The sensor network of claim 112, wherein the plurality of network elements is further configured to predistribute data anticipated for future use through the sensor network using low priority messages.

118. (Previously presented) The sensor network of claim 112, wherein:

the plurality of network elements is further configured to self-assemble into a multi-cluster network, wherein the self-assembly comprises a base node communicating an assembly packet through the sensor network.

119. (Previously presented) The sensor network of claim 112, wherein:

the distribution of the data processing further varies dynamically based on energy availability on the one or more other nodes.

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